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21 April 1952

MEMORANDUM FOR: THE RECORD

SUBJECT: Field Marking Equipment (RDP-60) - Tests of
Beacon, Infrared.

Abstract: The Applied Physics Branch conducted two night tests of the infrared beacon on 9 April and 14 April 1952. Results indicate that the unit is satisfactory for guiding a plane to a drop zone from five miles at 10,000 feet. Another test is scheduled for the near future to obtain further data.

1. A test of the infrared beacon was held on Thursday, 9 April 1952 to investigate the feasibility of the subject beacon. The tests were held in an area, approximately 900'x700', about five miles from Quantico, Virginia. The area was arranged for by Major Main. USMC Equipment Board.

2. Major Noeller, ARCS, USAF, pilot, Major Peters, ARCS, USAF, copilot, and [] Applied Physics Branch were in the plane, a C-47. Equipment in the plane included an M2 Sniperscope, Radio Firing Device Transmitter, and a Handie Talkie Radiophone for communications.

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3. The ground crew, supervised [] Applied Physics Branch, included the following:

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Equipment on the ground included the following:

- 6 Beacon Lamps
- Firing Device, Radio Detonator (VHF)
- 1 Radiophone Pack
- Image Metascope
- 2 Infrared Flashlights

4. The plane

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4. The plane left Andrews Field at 8:30 P.M. and arrived over the area at approximately 8:45 P.M. Visibility was fair with a light rain falling most of the time. Communications by means of the Handie Talkie Equipment was maintained out to a distance of about 15 miles from the area, with the antenna inside the plane. The remote switch was actuated reliably out to 10 miles from the area with the antenna inside the plane. These results were obtained at a mean altitude of about 1200 feet. The pattern of beacons (L-shaped with 5 beacons in the vertical portion of the L) was visible out to about 4 miles at 1500 feet. The pattern was very clear and strong as soon as it became visible, indicating that line of sight was interrupted by the trees at this point. The Sniperscope proved to be somewhat cumbersome because of the lamp attached, the power cord, and its length. Its narrow field of view made scanning somewhat difficult; this was augmented by the limited windshield surface of the C-47. There were quite a few strings of lights--lines of cars, street lamps, etc.--within a few miles of the area which bothered searching, but did not prevent positive identification of the pattern once it was sighted. In the fourth and final pass at the area, it was decided to head in from 10 miles north, locate the pattern and fly down the vertical line of the L-shaped pattern at about 500 feet. The pattern was located 3-4 miles out at 1200 feet. The plane dropped to 500 feet as it entered directly over the first beacon of the pattern.

5. The infrared flashlights developed for a special ad hoc proved to be readily visible through an image metascope at 800 feet. The flashlight was detected through the snooperscope in the plane about 2 miles out when it was aimed at the approaching plane.

6. A second test of the equipment was held on Tuesday, 14 April 1952, at the same area. Major Dukes, USMC Equipment Board, Pilot, Mr. [redacted] Technical Presentation Section, and [redacted] Chemical Branch, 50X1 represented the air crew in the C-47. [redacted] Applied Physics Branch, 50X1 and [redacted] consultant, were scheduled to fly in a Marine Corps 50X1 Helicopter. [redacted] Applied Physics Branch, and [redacted] 50X1 Chemical Branch, were the ground crew.

7. The weather forecast for this test was: Ceiling - 5000 feet, visibility - unrestricted, surface winds - 15 to 20 mph. The weatherman guessed the wind velocity fairly close, but the ceiling was 800-900 feet and rain fell constantly. Air-Ground contact was never made. The plane made one desultory pass at the general area and returned to the field. The plane was not seen from the ground during this pass nor did the air crew see the beacons. The helicopter never did get in the air because of bad weather. Conclusion: Weather forecasting in this area is unpredictable.

8. The infrared

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8. The infrared beacons functioned well from the ground crew standpoint on these tests. The lamps, with the mantles burned off, were transported over 200 miles by car and carried about the field several times with no damage to the mantles. It was demonstrated that before dusk the lamps could be filled, the mantles burned off, and the lamps placed in the pattern and lighted by one man in about 30 minutes. It was also shown that, with the mantles burned off, and the lamps filled, and using metasopes for viewing, the lamps could be lighted and placed in a pattern after dark, by two men, with no show of visible light. It seems completely reasonable that this could also be accomplished by one man although it would take longer and be more irksome.

9. Conclusions:

a. The system of the beacon, viewed through the Sniperscope appears to meet the operational requirements.

b. Another test will be scheduled to supplement a.

c. The next test will include viewing from the air by means of the US/C-3 viewer.

d. Future Operational and Field Tests should include viewing from the air by means of infrared binoculars, image metasopes, and any additional infrared viewers which can be obtained.

e. One flashing beacon in the pattern could facilitate location and identification of the pattern, and might permit one or two beacons to be dropped from the pattern. Such a beacon will be investigated.

f. Both air and ground crews will need some training in the use of this system.

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